EFFECTIVENESS OF STRATEGY TRAINING ALONG WITH CONVENTIONAL PHYSIOTHERAPY ON IMPROVING BALANCE IN SUBJECTS WITH PARKINSON'S DISEASE

Dissertation work submitted to

THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY

Chennai-32

towards partial fulfillment of the requirements of

MASTER OF PHYSIOTHERAPY

Degree programme

Submitted by

Reg no.271420204

P.P.G.COLLEGE OF PHYSIOTHERAPY

9/1, keeranatham road,

Saravanampatti,

Coimbatore – 641035

www.ppgphysiotherapy.ac.in

THE DISSERTATION ENTITLED

EFFECTIVENESS OF STRATEGY TRAINING ALONG WITH CONVENTIONAL PHYSIOTHERAPY ON IMPROVING BALANCE IN SUBJECTS WITH PARKINSON'S DISEASE

Submitted by

Reg no.271420204

Under the guidance of

Prof. Dr.PRATHEEBA. M.P.T (Neurology), MIAP

Dissertation submitted to

THE TAMIL NADY DR.M.G.R.MEDICAL UNIVERSITY

Chennai-32

Dissertation evaluated on ----------

Internal Examiner **External Examiner**

CERTIFICATE

CERTIFICATE I

This is no certify that the dissertation entitled **"EFFECTIVENESS OF STRATEGY TRAINING ALONG WITH CONVENTIONAL PHYSIOTHERAPY ON IMPROVING BALANCE IN SUBJECTS WITH PARKINSON'S DISEASE"** was carried out by Reg.No. **271420204** P.P.G College of physiotherapy, Coimbatore-35, affiliated to the Tamilnadu Dr. M.G.R medical university, Chennai -32, under the guidance of Prof. Mr. M.SANKAR SAHAYARAJ M.P.T (Neurology), PGDSPT, TTCY.

Prof. DR. K.RAJA SENTHIL
M.P.T (Cardio-Resp)., MIAP.,Ph.d

Principal

CERTIFICATE II

This is to certify that the dissertation entitled "EFFECTIVENESS OF STRATEGY TRAINING ALONG WITH CONVENTIONAL PHYSIOTHERAPY ON IMPROVING BALANCE IN SUBJECTS WITH PARKINSON'S DISEASE" was carried out by Reg.No. **271420204** P.P.G College of physiotherapy, Coimbatore-35, affiliated to the Tamilnadu Dr.M.G.R medical university, Chennai -32, under the guidance of direct supervision.

Prof. Dr. M.SANKAR SAHAYARAJ

M.P.T (Neurology), PGDSPT, TTCY.

Professor

ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

First I would like to thank the Lord Almighty and My Parents, My Brothers and Friends for their unfailing love, affection and endless blessings.

I express my sincere gratefulness to **Dr.L.P.THANGAVELU M.S., F.R.C.S.,** Chairman and **Mrs.SHANTHi Thangavelu M.A.,** Correspondent, PPG Group of institutions, Coimbatore for their encouragement and providing the source for the successful of the study.

With due respect, my most sincere thanks to My Principal **Prof. DR. KS.RAJA SHENTHIl M.P.T (Cardio-Resp)., MIAP.,(Ph.D).,** who gave me his valuable support throughout my studies.

I would like to thank my PG Class Co-ordinator **Prof. K.RAMADEVI M.P.T (Cardio-Resp)** for his valuable support throughout my studies.

Several special people have guided me and have contributed significantly to this effort. I thank my faculty members for their constant support and cheer all along in achieving the goal.

My hearty thanks to some Private Hospital Physiotherapists who gave me an opportunity to do my project work in their hospitals.

CONTENTS

"EFFECTIVNESS OF STRATEGY TRAINING ALONG WITH CONVENTIONAL PHYSIOTHERAPY ON IMPROVING BALANCE IN SUBJECTS WITH PARKINSON'S DISEASE"

ABSTRACT

Background and purpose : Disorders of posture & gait due to balance impairment are a major source of functional disability in individual with Parkinson disease. Fear of fall is commonly seen in them. Regular Physical exercise therapy can be beneficial to maintain and improve strength, balance, gait speed and quality of life in them. **Objectives:** To study effectiveness of balance training ALONG with conventional Physiotherapy improving balance in subjects with Parkinson's disease. **Methods:** 30 Patients of 40-70 yrs age having Parkinson disease were recruited in this study. They were allocated into two group & treated with Balance training along with conventional therapy for 4 weeks. Outcome measures were Berg balance scale score which were assessed before & after the intervention session. **RESULTS:** The result showed improvement in a balance for both group A & B. But there is better improvement in balance for berg balance scale score Balance training group along with conventional therapy than conventional therapy alone.

KEYWORDS: Balance training and Parkinson's disease.

INTRODUCTION

CHAPTER I

INTRODUCTION

Parkinson's diseases is a neurodegenerative disorder of unknown etiology, cause disability increased mortality and reducing the equality life. In India the prevalence rate of Parkinson's diseases is per 100000 populations are 14 in North India 27 in south India 16 in east, 363 for Parsis in Mumbai.

Individuals with Parkinson's diseases suffer loss of balancing decreased flexibility, poverty of movement and poor movement confidence.

The presence of postural instability separates mild Parkinson's disease from moderate and severe Parkinson's disease.

Rehabilitation management cannot alter the primary process but have important effect on sensory impairment and the functional disability that ensue.

Balance is the ability to maintain the body's center of mass over its base of support. Good balance exists as multiple system interacts flawlessly and automatically providing accurate and exact information to our nervous system

Reorganization in neural control of posture was the result of the functionary of central programs which co-ordinate the activity of different muscle group during postural control. Automatic postural responses (or) strategies that act to keep the body in the state of equilibrium.

Evidence support that the balance in controlled by neurally programmed synergies and coupling of muscles served the function of stabilizing ankle sway the response termed the sway synergy

Hip knee Ankle strategy are play as important role in maintaining the balance in subjects with Parkinson's diseases this study attempts to find on the effects of strategic training program with conventional physiotherapy on restoration of balance in Parkinson's patients.

1.2 STATEMENT OF THE STUDY

Efficacy of strategy training program over conventional balance program for restoration of balance in patients with Parkinson's disease.

1.3AIM OF THE STUDY

The main aim of the study is to find out the effectiveness of combined strategic program with conventional physiotherapy on balance in subjects with Parkinson's disease.

1.4 NEED OF STUDY

In Parkinson's patient the progressive loss of dopaminergic cells in the pars compacta of the substantia niagra in the mid-brain alters the brainstem results in increased and truncal tone, motor incoordination leads to loss of balance. It may expect that strategic training program with conventional physiotherapy will improve the balance in Parkinson's patients.

1.5 OBJECTIVE OF THE STUDY

To find out the effects of strategic training program on improving the balance in subjects with Parkinson's.

To find out the effects of conventional physiotherapy on improving balance in Parkinson's patient.

To compare the effects of both on improving the balance in Parkinson's patients.

1.6 OPERATIONAL DEFINITION

PARKINSON'S DISEASE

Parkinson's diseases is a neurodegenerative disorder of unknown etiology causing disability increased mobility and reducing the quality of life.

BALANCE

Balance is the ability to maintain the body's center of mass over its base of support.

1.7 HYPOTHESIS

ALTERNATE HYPOTHESIS

There will be a significant improvement in balance in Parkinson's subjects following the administration of strategic training program with conventional physiotherapy over conventional physiotherapy alone.

NULL HYPOTHESIS

There will not be a significant improvement in balance in Parkinson's subjects following the administration of strategic training program with conventional physiotherapy over conventional physiotherapy alone.

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

1. Louis ED et al (1997)

Parkinson's disease is a neurodegenerative disease of unknown etiology causing disability increased mortality and reducing in quality of life.

2. Willemsen MD, et al (2000)

The progressive loss of dopaminergic cells in the pars compacta of substantia nigra in mid brain alters the brainstem result in increased extremity and truncal tone, motor in coordination, leading to imbalance.

3. Barbeau A et al (1961)

Rehabilitative management cannot alter the primary process, but have important effect on the secondary impairment and the functional disability that ensue.

4. Birkmayer W (1961)

Levadopa has been used successfully in treating Parkinson's diseases since long time.

5. Shumway (2001)

Balance is the ability to maintain the body's center of mass over its base of support.

6. Nashner L (1990)

Balance is controlled by neutrally programmed synergies, and coupling of muscles served the function of stabilizing ankle sway, the response termed the "sway synergy"

7. Bloem (2001)

The Ankle strategy was first pattern for controlling upright sway. The ankle strategy restores the center of mass, to position of stability through body movement centered primary about the ankle joints.

8. Bloem (2001)

The ankle strategy also called ankle sway, uses the length of the foot as a lever to correct for minor loss of balance.

9. Horak F (1986)

Hip strategy controls the motion of the center of mass by producing large and rapid motion at the hip joint with anti-phase rotation of the ankle.

10. C Niltz (1998)

Specific strategic balance training and control exercises interval had significant improvement in balance.

11. MUNO3 – HELLIN et al-2010

OVID MEDLINE, COCHRANE DATABASE, PUBMED AND PHYSIOTHERAPHY EVIDENCE DATABESE Suggested that isokinetic muscle strength was decreased in patients with Parkinson's disease and that muscle weakness was not specifically related to tremor and rigidity. Bilateral asymmetrical muscle weakness was present in Parkinson's disease. When presenting with clinical unilateral hemi Parkinson's disease.

12. Morberg BM – 2014

Personal High intensity exercise programme may favorably influence both motor and non-motor

systems in patient with mild to moderate Parkinson's disease.

13. Shenx-1 – 2015

Assisted Balance training and gait training reduces falls in patients with Parkinson's disease . Eligible subjects were randomly allocated to and experimental group given technology assisted balance and gait training and an active controller group undertaking strengthening exercises. Fall incidence was recorded over 15 month after baseline assessment. Balance training group lower fall rate than control group at 15 months.

14. Balachandran et al-2015

Power training induces changes in Bradykinesia and muscle power in Parkinson's patient.

15. Wong Yu et al – 2015

Multi dimensial balance training programme improve balance and gait performance in people with parkinson's disease.

16. Azarpaikan A et al – 2014

Neurofeedback and balance training improve static and dynamic balance for parkinson's patient.

17. Zhong et al – 2013

WEBB (Weight bearing exercise for better balance) training improve balance impairment and it is suitable for Parkinson's patient.

18. Tambosco L et al – 2015

Aerobic and strength training improving physical habilities of patient suffering from Parkinson's disease.

19. Paul SS et al – 2014

Leg muscle power training using pneumatic varibale resistance equipment improve Leg muscle power for Parkinson's disease patient.

20. Smania et al – 2010

Balance training can improve postural stability in patients with Parkinson's patient.

21. Pedersens et al – 2015

Resistance training and exercise training are beneficial adjunct rehabilitation therapy in Parkinson's patient.

22. Emerson et al – 2013

Five studies conducted for the effect of resistance training for people with Parkinson's patient. Three randomized controlled trials scoring 7-9 and other two non randomized controlled trials scoring 4 and 6out of 11 quality criteria. Resistance training was shown to increase fat free mass, muscle strength and endurance as wall as improve mobility and performance in functional

task in this population.

23. Gracies JM-2010

moderate stage of Parkinson's patient focus on teaching motor strengthening programme in lower limp extensors, abductors, external rotation and stretching programme in their and antagonist.

24. Hirsch et al – 2011

Strength training improve muscle force, bradykinesia and quality of life in patients with Parkinson's patient.

25. Tomlinson CL et al – 2013

Physiotherapy aims to maximize functional ability and minimize secondary complication through movement rehabilitation within a context of education and support for the Parkinson's patient.

26. King LA et al – 2013

Exercise has the potential to help both motor (gait balance, strength) and non-motor (depression, apathy, fatigue, constipation aspects of Parkinson's patient secondary complication of immobility (cardio vascular and osteoporosis)

27. Denise Man et al – 2012

Fourty Eight people with Parkinson's patient in a weight training programme or another programme aimed at improving flexibility, balance and strength. Participants exercised for 1 hour twice a week for two years. People with weight training group saw a 7.3 improvement after two years on a measure. Our study show weight lifting a twice a week is helpful for improving the strength of Parkinson's disease.

28. Jeba Chithra et al – 2012

Resistance training n any exercise that causes their muscle to contact against an external resistance with the expectation of increasing strength tone, mass and also it is benefied for Parkinson's disease.

29. Birmingh Als et al – 2014 15 Subjects with Moderate Parkinson's underwent 16 weeks high intensity resistance learning combined with interval training designed to simultaneously challenge strength power, endurance balance and mobility

MATERILAS AND METHODOLOGO

DESIGN AND METHODOLOGY

STUDY DESIGN

Matched subject Experimental Study Design

STUDY SETUP

1) Madha Medical College and hospital
2) Deepam hospital

POPULATION

All the well oriented and well co-operative Parkinson subjects who fulfil the including criteria well included in this study.

SAMPLE SIZE

30 subjects from the population were selected by simple random sampling and they were allocated in to two group.

Group – I -> Strategic training program with conventional physical therapy.

Group -II -> Conventional physical therapy.

INCLUSION CRITERIA

- Both male and female genders.
- Age between 40 to 60 years.
- Grading 3 on yahr and Hoehn scale.
- Grade poor, fair on functional balance grade.

EXCLUSION CRITERIA

- Subjects with sensory and auditory deficits.
- Non Ambulant subjects.
- Subjects with cognitive detest also.
- Subjects with secondary Parkinson's disease.
- Subjects with Parkinsonism-plus syndrome.

INDEPENDENT VARIABLE

- Strategic training programs
- Conventional Physiotherapy.

DEPENDENT VARIABLE

- Score in Berg Balance Scale.

MEASUREMENT TOOLS

- Berg Balance Scale
- Hoehn and Yahr Grading
- Functional Balance Grade.

MATERIAL USED ON THE STUDY

- Mat
- Table (or) Chair
- Paper and Pencil
- Stopwatch
- Chair with arm support

DURATION OF THE STUDY

4 Weeks

METHODOLOGY AND PROCEDURE

Group – I

STRATEGIC TRAINING PROGRAM WITH CONVENTIONAL HYSIOTHERAPY

Before giving the independent variable the pretest scores of functional balance grade and Berg Balance Scale was taken.

PROCEDURE

STRATEGIC TRAINING PROGRAM

Experimental group was given strategy training and conventional balance program. The patient performs a set of exercise while standing on a mat to avoid the slipper feel of the floor and to have a comfortable base of support. The patient is asked to stand with stationary base of support then starting with exercises sit-to-stand-to-sit, raising from chair, heel raises, and toe offs, knee squats, or bending knees and then coming up, standing and sidekicks, front kicks, back kicks, marching on spot or marching, and leg lifts. Each of exercises was performed for repetition of 10 times each.

The patient was instructed to practice ankle strategy on a broad surface. Clients were asked to sway slowly in anterior/ posterior, right/ left, first to and from midline, progressing to passing midline, and finally progressing to sway toward the periphery without return to midline. Head and pelvis should travel in the same direction at same time. Clients can practice standing near a wall with a chair/table in front of them, swaying forward to touch the chair/table with their stomach (leading with the pelvis) and backward to touch the wall with the back of their head. Cues are given not to bow to the table/chair and not to touch the wall with the buttocks Hip strategy is practiced on a narrow surface. The head and pelvis travel in opposite direction to counter balance each other, in a forward bow/ backward bending motion foe anterior/posterior sway. Using the wall and table/chair, client can be cued to bow to touch the nose with table/ chair while simultaneously touching the wall with the buttocks. Relaxation exercises in between the treatment was incorporated at times when the patients feel fatigue or tired.

Figure 1: Assisted Arm movement

Figure 2: Squating

CONVENTIONAL PHYSIOTHERAPY

Conventional Balancing Exercise Program, General exercise program included. The patient is asked to sit comfortably in the chair, slow rhythmic deep breathing exercise is incorporated at the starting of session and at times the patient feels fatigue or tired. The patient performs a set of exercise while standing on a mat to avoid the slipper feel of the floor and to have a comfortable base of support. The patient is asked to stand with stationary base of support then starting with exercises sit-to-stand-to-sit, raising from chair, heel raises, and toe offs, knee squats, or bending knees and then coming up, standing and sidekicks, front kicks, back kicks, marching on spot or marching and leg lifts. Each of exercises was performed for repetition of 10 times each.

After the intervention the post test scores of functional balance grade and Berg balance scale was taken.

The frequency of treatment was 20 sessions. 5 sessions a week for 4 consecutive week with 45 minutes in each sessions.

Figure 3: Marching

Figure 4: Standing Posture

GROUP – II

CONVENTIONAL PHYSIOTHERAPY

Before giving the independent variable the pretest scores of functional balance grade and Berg balance scale was taken.

PROCEDURE

Conventional Balancing Exercise Program, General exercise program included. The patient is asked to sit comfortably in the chair, slow rhythmic deep breathing exercise is incorporated at the starting of session and at times the patient feels fatigue or tired. The patient performs a set of exercise while standing on a mat to avoid the slipper feel of the floor and to have a comfortable base of support. The patient is asked to stand with stationary base of support then starting with exercises sit-to-stand-to-sit, raising from chair, heel raises, and toe offs, knee squats, or bending knees and then coming up, standing and sidekicks, front kicks, back kicks, marching on spot or marching and leg lifts. Each of exercises was performed for repetition of 10 times each.

After the intervention the post test scores of functional balance grade and Berg balance scale was taken.

The frequency of treatment was 20 sessions. 5 sessions a week for 4 consecutive week with 45 minutes in each sessions.

DATA ANALYSIS

The data collected were classified, tabulated and analysed in the form of tables and graphs. The samples are matched with respect to age sex and are similar with respect to occupation and treatment.

Mann verifying test and Wilcoxon signed rank test, Z value and P value is used to find the significance of Berg balance scale, rank, sum of rank between pre and post treatment sessions.

STATISTICAL DATA ANALYSIS TECHNIQUE

In Group I and Group II, all data was expressed as mean ± SD and was statistically analyzed using paired't' test and independent 't' test to determine the statistical difference among the parameters at 0.5% level of significance by employing the statistical tools as given below

Mean $\bar{x} = \frac{\sum x}{n}$; Standard deviation SD = $\sqrt{\frac{\sum(x-x)^2}{n-1}}$

Paired t-test $t_{cal} = \frac{\bar{d}}{s_d/\sqrt{n}}$

Where, $\bar{d}$ = mean difference; S_d = Standard deviation of difference

Independent t – test $t_{cal} = \left|\frac{x^1 - x^2}{SE}\right|$

SE= $s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$

Where, s = SE = $\sqrt{\frac{(n_1-1){s_1}^2+(n_2-1){s_2}^2}{n_1+n_2-2}}$

n1, n2 = Size of the samples of two groups.

TABLE 4.1 - INTERGROUP COMPARISON OF MEAN AND STANDARD DEVIATION USING BERG BALANCE SCALE.

Groups	Time Interval	No. of Subjects	Mean	Std. Deviation	Wilcoxon Signed Rank Test (z-value)	p-value
Group 1 Strategy training program and Conventional balance program	Pre test	15	32.07	1.831	3.437	<0.001
	Post test	15	46.2	1.612		
Group 2 Conventional balance program	Pre test	15	30.53	1.302	3.431	<0.001
	Post test	15	40	1.363		

When compared group 1 and group 2 the P value (<0.0001) of post test for both groups were lesser then the P value (<0.015) of pre test of both groups.

TABLE 4.2 - RANK AND SUM RANKS USING WILCOXON SIGNED IN BOTH GRAPHS.

Berg Balance Scale		N	Mean Rank	Sum of Ranks	Wilcoxon signed rank test (z-value)	p-value
Synergy and Coventional Exercises	Negative Ranks	0	-	-	3.437	<0.001
	Positive Ranks	15	7.5	119		
	Ties	0				
Conventional Exercises	Negative Ranks	0	-	-	3.431	<0.001
	Positive Ranks	15	8	120		
	Ties	0				

Based upon the rank, using Wilcoxon signed rank test value (Z-Value) 3.437 (<0.001) of group 1 has derived. Based upon the rank, using Wilcoxon signed rank test (Z-Value) 3.431, P value (<0.001) of group 2 has been derived.

TABLE - 4.3 COMPARISON OF TWO GROUPS USING BERG BALANCE SCALE

Scale	Study group	No. of Subjects	Mean	SD	Mann-Whitney test (z-value)	p-value
Hoehn and Yahr Scale	Synergy and Conventional exercises	15	3	0	-	-
	Conventional Exercises	15	3	0		
Berg Balance Scale (Pre-test)	Synergy and Conventional Exercises	15	32.07	1.831	2.438	<0.015
	Conventional Exercises	15	30.53	1.302		
Berg Balance Scale (Post-test)	Synergy and Conventional Exercises	15	46.2	1.612	4.736	<0.0001
	Conventional Exercises	15	40	1.363		

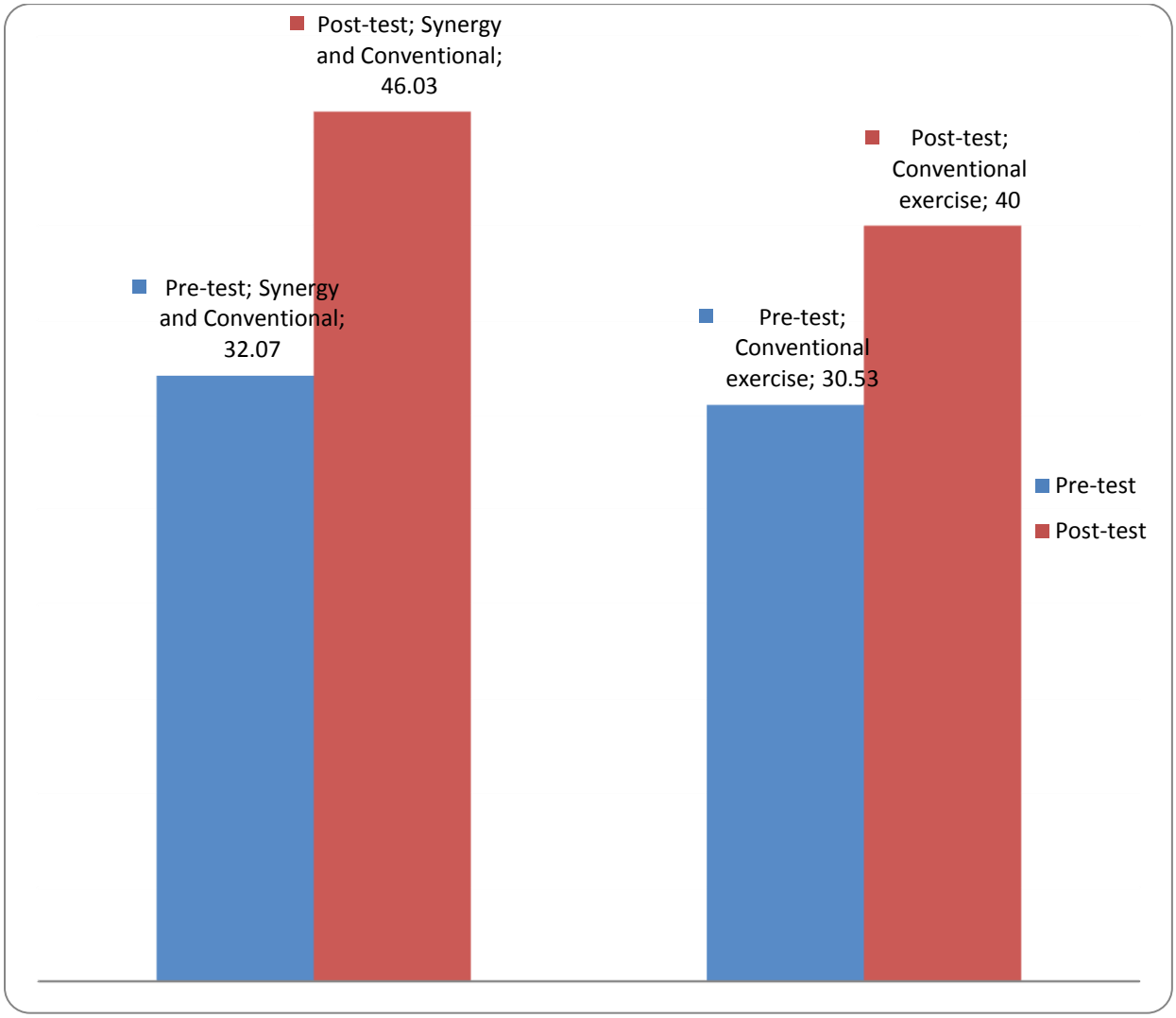
The smaller the P value shows significant improvement. The P value for post test for both group is < 0.001 and Z-Value 4.736 and P-Value for pre test for both groups is <0.015 and Z-Value 2.438.It shows post test is significant then pre test for Berg-balance scale and both groups shows significant improvement.

TABLE - 4.4 COMPARISON OF ALL THE RANK AND SUM OF RANK OF DEPENDENT VARIABLE IN TWO GROUPS.

Scale	Study group	N	Mean Rank	Sum of Ranks	Mann-Whitney test (z-value)	p-value
Hoehn and Yahr Scale	Synergy and Conventional exercises	15	15.5	232.5	-	-
	Conventional Exercises	15	15.5	232.5		
Berg Balance Scale (Pre-test)	Synergy and Conventional Exercises	15	19.3	289.5	2.438	<0.015
	Conventional Exercises	15	11.7	175.5		
Berg Balance Scale (Post-test)	Synergy and Conventional Exercises	15	23	345	4.736	<0.0001
	Conventional Exercises	15	8	120		

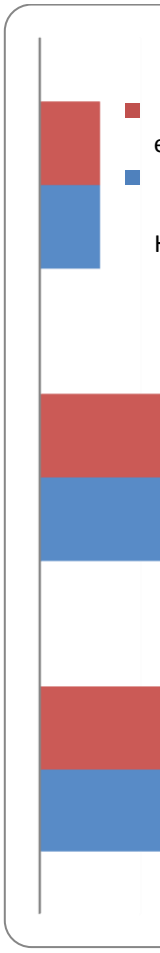
The smaller the P value shows significant improvement. The P value for post test for both group is < 0.001 and Z-Value 4.736 and P-Value for pre test for both groups is <0.015 and Z-Value 2.438.It shows post test is significant then pre test for Berg-balance scale and both groups shows significant improvement.

GRAPH 1 - MEAN VALUE OF GROUP 1 AND 2



GRAPH

2: MEAN FOR HOEHN AND YAHR SCALE IN GROUP I & 2



	Synergy and Conventional	Conventional exercise
Pre-test	32.07	30.53
Post-test	46.03	40

RESULT

The results showed that the use of conventional balance program with strategy training program for balance has shown to improve balance in Parkinson's patients.

The data analysis found a significant difference between conventional balance program and conventional balance program with strategic training program .This study supports the use of conventional with strategy training to improve balance in patients with Parkinson's disease.

DISCUSSION

In this study we have tried to find out the effects of conventional balance program, conventional balance program with strategy training program and conventional balance program with strategy training program over conventional balance program. The balance parameter using Berg Balance Scale is measured in both the groups. The present study suggest that conventional balance program with strategy improves balance, when tested before and after the intervention. Comparison of inter group 1 and 2 shows that group 1 had more significant improvement in balance p-value (0.015).

Intra group showed analysis of age within the age group of <=55 and 7.2% of both gender were are at risk of developing Parkinson's diseases in group 1.Total of 18% of both male and female are at risk of getting Parkinson's disease within the age group of 56-60. In group 2 total of 5.4% of both male and female are at risk of getting Parkinson's disease within the age group of <=55.Total of 20% of both male and female are at risk of getting Parkinson's disease within the age group of 56-60.

On group analysis in group 1 and group 2, conventional balance program with strategy training was effective in improving the balance in patients with Parkinson's diseases, is supported by previous researchers. Conventional balance exercise has shown improvement in many of the clinical conditions. These balancing exercise show improvement in stroke patients, risk of falls in elderly people, risk of falls in older women, multiple sclerosis, Parkinson's diseases patient and its supporting evidence are follows. Ryosuke Shigemastsu et al: stated dance based aerobic exercise improved balance. Campbell A. J et al: stated home based exercise was delivered to older women to

prevent falls. Gehlsen et al: stated static balance, dynamic balance improved balance in people with history of falls. O' Sullivan S and Schmitz: stated balance training in Parkinson's patients when delivered showed improvement in balance in Parkinson's patients.

Strategy training program involving ankle, hip strategy training in group of people has shown improvement in balance. Strategy training program along with general balancing program have reported to improve balance to considerable limits. Nashner L M stated that ankle sway that control balance by neurally programmed synergies brings about improvement in balance. The ankle sways to control balance in Parkinson's diseases. Jennifer C Nitz et al: stated that specific balance strategy training and control exercises interval had significant improvement in balance as compared to control exercise intervention. Shumway Cook A et al: stated a combination of activities along with strategy training exercises when delivered improved balance and functional ability in addition to reducing risk of falls.

The program of physical therapy in Parkinson's disease comprises of repetitive exercises directed at improving the balance. Both the balance group experimental and control group benefited from the intervention with significant increases in balance. Individual group analyses indicated that those participants receiving the strategy training did better than the conventional training. Such intervention encouraged increased speed range of motion, in addition improved flexibility and balance. Retraining strategies for balance control involve patient to recover, sensory and motor strategies to meet the demands of balance required for functional task. Balance training program, conducted under proper supervision, is enjoyable, effective, and a relatively safe way to improve balance in persons with Parkinson's diseases. The goal leads to development of multi joint coordinated movement, a sensitive task for the feet to hold, balance the heavy mass of bodies and the head.

LIMITATIONS OF STUDY

- Small sample in size.
- Less treatment duration.
- Subjects selected were only those who were moderately disabled.

RECOMMENDATION FOR THE FURTHER STUDY

This study can be done with a lager sample size; with more aged people and increased duration treatment. More balance variables can be studied with effect of yoga, meditation, and aerobic and dance-aerobic exercise. The study can be included with strengthening program for ankle muscle and then training for ankle-hip strategy. This Study can be done on risk of falls in older people and follow up also recommended.

CONCLUSION

From the result of this study it was concluded that strategic training program with conventional physiotherapy shows better improvement balance than that of conventional physiotherapy alone in Parkinson's patients.